

## SEQUENCE LISTING

&lt;110&gt; Merck &amp; Co., Inc.

<120> OPTIMIZED EXPRESSION OF HPV 58 L1 In  
YEAST

&lt;130&gt; 21561 PCT

&lt;150&gt; 60/519,211

&lt;151&gt; 2003-11-12

&lt;160&gt; 10

&lt;170&gt; FastSEQ for Windows Version 4.0

&lt;210&gt; 1

&lt;211&gt; 1497

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; HPV58 L1-R

&lt;400&gt; 1

```

atgtccgtct ggagaccatc cgaagctacc gtctacttgc caccagttcc agtctccaag 60
gtcgtctcca ctgacgaata cgtctctaga acctctatct actactacgc tggttcctct 120
agattgttgg ctggttgtaa cccatacttc tccatcaagt ctccaacaa caacaagaag 180
gtcttggttc caaaggctctc tggtttgcaa tacagagtct tcagagtcag attgccagac 240
ccaaacaagt tcggtttccc agacacttcc ttctacaacc cagacactca aagattgggtc 300
tggtgcttgg tcggtttgga aatcggtaga ggtcaaccat tgggtggttg tgtctctggt 360
caccatact tcaacaagtt cgacgacacc gaaacctcca acagataccc agctcaacca 420
ggttctgaca acagagaatg tttgtccatg gactacaagc aaaccaatt gtgtttgatc 480
ggttgtaagc caccaactgg tgaacactgg ggtaagggtg ttgcttgtaa caacaacgct 540
gctgctaccg actgtccacc attggaattg ttcaactcca tcatcgaaga cggtgacatg 600
gtcgacactg gtttcgggtg tatggacttc ggtaccttgc aagctaacia gtccgacgtt 660
ccaatcgaca tctgtaactc cactgtaag taccagact acttgaagat ggcttctgaa 720
ccatacggtg actccttggt cttcttcttg agaagagaac aaatgttcgt cagacacttc 780
ttcaacagag ctggtaagtt ggggtgaagct gttccagacg acttgtagat caaggggttct 840
ggtaacaccg ctgtcatcca atcctctgct ttcttcccaa ctccatctgg ttccatgggtc 900
acctctgaat ctcaattggt caacaagcca tactgggtgc aaagagctca aggtcacaac 960
aacggtatct gttggggtaa ccaattgttc gtcactgtcg tcgacaccac tagatccact 1020
aacatgacct tgtgtaccga agtcaccaag gaaggtacct acaagaacga caacttcaag 1080
gaatacgtca gacacgtcga ggaatacgaac ttgcaattcg tcttccaatt gtgtaagatc 1140
accttgactg ctgaaatcat gacctacatc cacaccatgg actctaact cttggaagac 1200
tggaattcg gtttgactcc accaccatct gcttccttgc aagacaccta cagattcgtc 1260
acctctcaag ctatcacctg tcaaaagact gctccaccaa aggaaaagga agaccattg 1320
aacaagtaca cttcttggtg agtcaacttg aaggaaaagt tctctgctga cttggaccaa 1380
ttccattgg gtagaaagtt cttgttgcaa tctggtttga aggctaagcc aagattgaag 1440
agatctgctc caaccactag agctccatcc accaagagaa agaagggtcaa gaagtaa 1497

```

&lt;210&gt; 2

&lt;211&gt; 498

&lt;212&gt; PRT

&lt;213&gt; Human Papillomavirus Type 58

&lt;400&gt; 2

```

Met Ser Val Trp Arg Pro Ser Glu Ala Thr Val Tyr Leu Pro Pro Val
1           5           10           15
Pro Val Ser Lys Val Val Ser Thr Asp Glu Tyr Val Ser Arg Thr Ser
20           25           30

```

```

Ile Tyr Tyr Tyr Ala Gly Ser Ser Arg Leu Leu Ala Val Gly Asn Pro
    35          40          45
Tyr Phe Ser Ile Lys Ser Pro Asn Asn Asn Lys Lys Val Leu Val Pro
    50          55          60
Lys Val Ser Gly Leu Gln Tyr Arg Val Phe Arg Val Arg Leu Pro Asp
65          70          75          80
Pro Asn Lys Phe Gly Phe Pro Asp Thr Ser Phe Tyr Asn Pro Asp Thr
    85          90          95
Gln Arg Leu Val Trp Ala Cys Val Gly Leu Glu Ile Gly Arg Gly Gln
    100          105          110
Pro Leu Gly Val Gly Val Ser Gly His Pro Tyr Phe Asn Lys Phe Asp
    115          120          125
Asp Thr Glu Thr Ser Asn Arg Tyr Pro Ala Gln Pro Gly Ser Asp Asn
    130          135          140
Arg Glu Cys Leu Ser Met Asp Tyr Lys Gln Thr Gln Leu Cys Leu Ile
145          150          155          160
Gly Cys Lys Pro Pro Thr Gly Glu His Trp Gly Lys Gly Val Ala Cys
    165          170          175
Asn Asn Asn Ala Ala Thr Asp Cys Pro Pro Leu Glu Leu Phe Asn
    180          185          190
Ser Ile Ile Glu Asp Gly Asp Met Val Asp Thr Gly Phe Gly Cys Met
    195          200          205
Asp Phe Gly Thr Leu Gln Ala Asn Lys Ser Asp Val Pro Ile Asp Ile
210          215          220
Cys Asn Ser Thr Cys Lys Tyr Pro Asp Tyr Leu Lys Met Ala Ser Glu
225          230          235          240
Pro Tyr Gly Asp Ser Leu Phe Phe Phe Leu Arg Arg Glu Gln Met Phe
    245          250          255
Val Arg His Phe Phe Asn Arg Ala Gly Lys Leu Gly Glu Ala Val Pro
    260          265          270
Asp Asp Leu Tyr Ile Lys Gly Ser Gly Asn Thr Ala Val Ile Gln Ser
    275          280          285
Ser Ala Phe Phe Pro Thr Pro Ser Gly Ser Met Val Thr Ser Glu Ser
290          295          300
Gln Leu Phe Asn Lys Pro Tyr Trp Leu Gln Arg Ala Gln Gly His Asn
305          310          315          320
Asn Gly Ile Cys Trp Gly Asn Gln Leu Phe Val Thr Val Val Asp Thr
    325          330          335
Thr Arg Ser Thr Asn Met Thr Leu Cys Thr Glu Val Thr Lys Glu Gly
    340          345          350
Thr Tyr Lys Asn Asp Asn Phe Lys Glu Tyr Val Arg His Val Glu Glu
    355          360          365
Tyr Asp Leu Gln Phe Val Phe Gln Leu Cys Lys Ile Thr Leu Thr Ala
370          375          380
Glu Ile Met Thr Tyr Ile His Thr Met Asp Ser Asn Ile Leu Glu Asp
385          390          395          400
Trp Gln Phe Gly Leu Thr Pro Pro Pro Ser Ala Ser Leu Gln Asp Thr
    405          410          415
Tyr Arg Phe Val Thr Ser Gln Ala Ile Thr Cys Gln Lys Thr Ala Pro
    420          425          430
Pro Lys Glu Lys Glu Asp Pro Leu Asn Lys Tyr Thr Phe Trp Glu Val
    435          440          445
Asn Leu Lys Glu Lys Phe Ser Ala Asp Leu Asp Gln Phe Pro Leu Gly
450          455          460
Arg Lys Phe Leu Leu Gln Ser Gly Leu Lys Ala Lys Pro Arg Leu Lys
465          470          475          480
Arg Ser Ala Pro Thr Thr Arg Ala Pro Ser Thr Lys Arg Lys Lys Val
    485          490          495
Lys Lys

```

<210> 3  
 <211> 1497  
 <212> DNA  
 <213> Human Papillomavirus Type 58

<400> 3  
 atgtccgtgt ggcggcctag tgaggccact gtgtacctgc ctctgtgtgc tgtgtctaag 60  
 gttgtaagca ctgatgaata tgtgtcacgc acaagcattt attattatgc tggcagttcc 120  
 agacttttgg ctggttgcaa tccatatttt tccatcaaaa gtcccaataa caataaaaaa 180  
 gtattagttc ccaaggatc aggcttacag tatagggtct ttaggggtgcg tttacctgat 240  
 cccaataaat ttgggtttcc tgatacatct tttataaacc ctgatacaca acgtttgggtc 300  
 tgggcatgtg taggccttga aataggtagg ggacagccat tgggtgttgg cgtaagtgggt 360  
 catccttatt tcaataaatt tgatgacact gaaaccagta acagatatcc cgcacagcca 420  
 gggctctgata acaggggaatg cttatctatg gattataaac aaacacaatt atgtttaatt 480  
 ggctgtaaac ctcccactgg tgagcattgg ggtaaagggtg ttgcctgtaa caataatgca 540  
 gctgctactg attgtcctcc attggaactt ttaattcta ttattgagga tggtagcatg 600  
 gtagatacag ggtttggtatg catggacttt ggtacattgc aggctaataa aagtgatgtg 660  
 cctattgata tttgtaacag tacatgcaaa tatccagatt atttaaaaaat ggccagtgaa 720  
 ccttatgggg atagtttgtt cttttttctt agacgtgagc agatgtttgt taggcacttt 780  
 ttaaataggg cgggaaaact tggcgaggct gtcccggatg acctttatat taaaggggtcc 840  
 ggtaatactg cagttatcca aagtagtgca ttttttccaa ctctagtgg ctctatgggtt 900  
 acctcagaat cacaattatt taataagcct tattgggtac agcgtgcaca aggtcataac 960  
 aatggcattt gctggggcaa tcagttattt gttaccgtag ttgataccac tcgtagcact 1020  
 aatatgacat tatgcactga agtaactaag gaaggtagat ataaaaatga taattttaag 1080  
 gaatatgtac gtcattgtga agaataatgac ttacagtttg tttttcagct ttgcaaaatt 1140  
 aactaactg cagagataat gacatatata catactatgg attccaatat tttggaggac 1200  
 tggcaatttg gtttaacacc tcctccgtct gccagtttac aggacacata tagatttgtt 1260  
 acctcccagg ctattacttg ccaaaaaaca gcaccccta aagaaaagga agatccatta 1320  
 aataaatata ctttttggga ggtaactta aaggaaaagt tttctgcaga tctagatcag 1380  
 tttccttttg gacgaaagt tttattacaa tcaggcctta aagcaaagcc cagactaaaa 1440  
 cgttcggccc ctactaccgc tgcaccaatc accaaacgca aaaagggtta aaaataa 1497

<210> 4  
 <211> 21  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> PCR Primer

<400> 4  
 atgtccgtgt ggcggcctag t 21

<210> 5  
 <211> 28  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> PCR Primer

<400> 5  
 gagatctgtg taagtaccac aacaatta 28

<210> 6  
 <211> 31  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> PCR Primer

<400> 6  
 gggatccac aaaacaaaat gtccgtgtgg c 31  
 <210> 7  
 <211> 28  
 <212> DNA  
 <213> Artificial Sequence  
 <220>  
 <223> PCR Primer  
 <400> 7  
 gggatccgtg taagtaccac aacaatta 28  
 <210> 8  
 <211> 34  
 <212> DNA  
 <213> Artificial Sequence  
 <220>  
 <223> PCR Primer  
 <400> 8  
 ggatcccaca aaacaaaatg tctgtctgga gacc 34  
 <210> 9  
 <211> 34  
 <212> DNA  
 <213> Artificial Sequence  
 <220>  
 <223> PCR Primer  
 <400> 9  
 ggatcccaca aaacaaaatg tctgtctgga gacc 34  
 <210> 10  
 <211> 1497  
 <212> DNA  
 <213> Artificial Sequence  
 <220>  
 <223> HPV 58 L1 antisense  
 <400> 10  
 tacaggcaga cctctggtag gcttcgatgg cagatgaacg gtgggtcaagg tcagagggttc 60  
 cagcagaggt gactgcttat gcagagatct tggagataga tgatgatgcg accaaggaga 120  
 tctaacaacc gacaaccatt gggatgaag aggtagttca gaggtttgtt gttgttcttc 180  
 cagaaccaag gtttccagag accaaacggt atgtctcaga agtctcagtc taacgggtctg 240  
 gggtttgttca agccaaaggg tctgtgaagg aagatgttgg gtctgtgagt ttctaaccag 300  
 acccgaacac agccaaacct ttagccatct ccagttggta acccacaacc acagagacca 360  
 gtgggtatga agttgttcaa gctgctgtgg ctttggaggt tgtctatggg tcgagttggt 420  
 ccaagactgt tgtctcttac aaacagggtac ctgatgttcg tttgggttaa cacaactag 480  
 ccaacattcg gtggttgacc acttgtgacc ccattcccac aacgaacatt gttgttgcca 540  
 cgacgatggc tgacaggtgg taaccttaac aagttgaggt agtagcttct gccactgtac 600  
 cagctgtgac caaagccaac atacctgaag ccatggaacg ttcgattgtt caggctgcaa 660  
 ggtagctgt agacattgag gtggacattc atgggtctga tgaacttcta ccgaagactt 720  
 ggtatgccac tgaggaacaa gaagaagaac tcttctcttg ttacaagca gtctgtgaag 780  
 aagttgtctc gaccattcaa cccacttcga caaggtctgc tgaacatgta gttcccaaga 840  
 ccattgtggc gacagtaggt taggagacga aagaagggtt gaggtagacc aaggtaccag 900  
 tggagactta gagttaacaa gttgttcggt atgaccaacg tttctcgagt tccagtgttg 960  
 ttgccataga caacccatt ggtaacaag cagtgcacgc agctgtggtg atctaggtga 1020

ttgtactgga	acacatggct	tcagtgggtc	cttccatgga	tggtcttgct	gttgaagttc	1080
cttatgcagt	ctgtgcagct	ccttatgctg	aacgttaagc	agaagggtta	cacattctag	1140
tgggaactgac	gacttttagta	ctggatgtag	gtgtgggtacc	tgagattgta	gaaccttctg	1200
accgttaagc	caaactgagg	tgggtggtaga	cgaaggaacg	ttctgtggat	gtctaagcag	1260
tggagagttc	gatagtggac	agttttctga	cgaggtgggt	tccttttcct	tctgggtaac	1320
ttgttcatgt	ggaagaccct	tcagttgaac	ttccttttca	agagacgact	gaacctgggt	1380
aagggtaacc	catctttcaa	gaacaacgtt	agaccaaact	tccgattcgg	ttctaacttc	1440
tctagacgag	gttggtgatc	tcgaggtagg	tggttctctt	tcttccagtt	cttcatt	1497